

**DENNIS H. LAMBERT & ASSOCIATES**

*Attorneys at Law*  
7000 View Park Drive  
Burke, Virginia 22015

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Telephone (703) 451-1227  
Facsimile (703) 451-1297  
E-mail: lampat@cox.net

Applicant: Kellie Ross and Arthur A. Krause  
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Mail Stop: **PATENT APPLICATION**  
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S I R:

Please find attached hereto for filing, the following:

1. Check in the amount of \$385.00
2. Certificate of Express Mailing
3. Utility Patent Application Transmittal
4. Fee Transmittal
5. Specification (9 pp., including 15 claims)
6. Drawings (3 Sheets, Figs. 1-9).

Along with a first-class postage prepaid return receipt card.

Respectfully submitted,

Dennis H. Lambert & Associates



Dennis H. Lambert  
Reg. No. 25,017

DHL:ksh

Dennis H. Lambert & Associates  
7000 View Park Drive  
Burke, Virginia 22015  
Tel: 703-451-1227 / Fax: 703-451-1297  
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## INTRAVENOUS LINE HOLDER

### Technical Field:

This invention relates to medical devices, and more particularly, to a device for keeping multiple intravenous lines organized and separate from one another.

### Background Art:

5           The treatment of a patient often requires the simultaneous administration of several intravenous solutions, and/or the use of intravenous catheters and monitoring devices for such measurements as central venous pressure, pulmonary artery and pulmonary wedge pressures, and the like. This is especially true in operating room environments and acute care settings, such as adult, pediatric and neonatal intensive care units.

10           Intravenous lines typically extend from a source of medication suspended from an IV pole to an injection site on the patient, or from a catheter associated with the patient to measuring or monitoring equipment. In order to accommodate movement of the patient, and to place the medication and/or monitoring equipment out of the way, the individual lengths of IV line can be quite long.

15           It is critically important that each length of IV line is connected between a respective injection site and the appropriate medication or monitoring device. As the number and length of the IV lines being used increase, this task becomes more difficult and time consuming, especially when it is considered that the lines are clear and the solutions that run through them are primarily clear. It is up to the nurse to ensure that each individual line is properly identified and  
20           connected. The skills of a registered nurse in an acute setting are of paramount importance in the quality of patient care, and the time required for the nurse to carefully inspect and ensure that each line is properly connected adds to the cost of medical care. More importantly, an improperly connected IV line can have serious consequences on the health of the patient, and can even lead to the patient's death.

25           At the present time, nurses generally have no option but to label lines with silk tape in an attempt to identify each line. While this may appear to be a solution to the problem of tangled lines and intravenous line identification, the tape often becomes soiled, making it difficult to

read, or the tape may come loose from the line, or more importantly, does nothing to prevent the lines from becoming tangled. In an emergency situation, the nurse needs to rapidly identify each line in order to medicate the patient with the appropriate drugs. If the nurse mistakenly injects a drug into the wrong line, the consequences can be lethal to the patient.

5           With hospitals and other medical care facilities having to increasingly cope with a nursing shortage and with budget constraints, while at the same time ensuring patient safety, efforts to save time and money have become increasingly important. In a “typical” post-transplant patient, it takes two nurses nearly fifteen minutes to untangle the lines on a patient coming from the surgery suite. In addition to the cost associated with this task, the nurses’ time  
10           could be better spent doing patient assessment, intervention, or evaluation of treatments.

          Further, hospitals are required to keep IV line as clean as possible, not allowing it to touch the floor in an effort to prevent nosocomial infections. Frequently, IV line is coiled then taped to prevent it from touching the floor. However, when a patient needs to be transported or repositioned, the tape is difficult to remove and inevitably the lines again become tangled.

15           Also, IV lines are sometimes taped to the patient’s skin to help keep the lines separated and organized. Patients in trauma intensive care units frequently have multiple open wounds on them, requiring dressing changes and additional care. Applying tape to the skin may not be a  
          viable option in these cases.

          In order to alleviate these problems and concerns, various devices have been developed in  
20           the prior art. Exemplary of such devices are those disclosed in U.S. patents 4,308,642, 4,795,429, 4,988,062, 5,224,674, 5,226,892, 5,389,082, 5,795,335, and Des 263,624. While the devices disclosed in these patents do function as IV line organizers, they are relatively complicated and expensive. Under present day circumstances, it is important to have an IV line organizer that is easy to use and that is inexpensive.

25           Accordingly, there is need for an inexpensive IV line organizer that is simple in construction and easy to use.

**Disclosure of the Invention:**

          The present invention comprises an inexpensive IV line holder and separator that is  
30           simple in construction and easy to use. More specifically, the IV line holder of the invention is a

thin, flat sheet of material, with at least one marginal edge portion that is bendable to an angled position to define a wing. Openings are formed through the wing for receiving and holding lengths of IV line in separated, parallel relationship. Cuts or slits lead from the edges of the margin portions to the openings, and the lines can be inserted through these cuts or slits into the openings. In essence, the lines are “snapped” into place. The anterior or upper surface of the central portion of the holder, between the margin portions, provides a planar surface on which suitable indicia may be placed to identify the purpose of the line held beneath that portion of the holder, or the material flowing through that line.

In a preferred embodiment, opposite marginal edge portions are bendable to define a pair of opposed wings having aligned openings for receiving IV lines.

Further, in the preferred embodiment the holder is made of a thin, unitary sheet of paperboard that is rectangular or square in shape, scored along opposite sides to define the opposed bendable wings or margins, and that may be die cut to form the slits and openings in the wings. The center portion of the sheet, between the bendable wings, may be printed with suitable indicia, and/or may be marked with suitable indicia to identify the separate lines held thereby. For example, color coded labels can be applied to the anterior surface of the central portion of the holder. Three-channel pumps with color-coded channels for line identification are currently available in intensive care settings. The color-coding on the holder of the invention can match the color-coding on these pumps.

In use, a nurse simply presses a line through the slits into each opening in the wing or wings, so that the lines are held in separated, parallel relationship. In the preferred embodiment, the lines extend beneath the central portion of the holder and through a pair of aligned openings in wings at opposite sides of the holder. As many lines as desired may be engaged with the holder, up to the maximum number of lines the holder will accommodate. In this regard, the holder can be designed to hold any desired number of lines, although three to six pairs of aligned openings, for holding three to six lines, typically would be provided in the holder. If more lines are required, multiple holders can be used. If desired, the holder can be attached to a surface to support it and the attached lines in a particular location. Any suitable means can be used to attach the holder to a surface, such as a clip, or Velcro fasteners, or an adhesive backing on the holder, etc.

The slits leading into the openings can have various configurations to more securely retain the lines in the openings and at the same time enable easy insertion of the lines through the slits into the openings. For instance, the slits can have offset portions, or can enter the opening out of alignment with the position of the line when it is in place, thereby resisting inadvertent retraction of the line through the slit during use.

The IV line holder of the invention may be made of any suitable material, although in a preferred embodiment it is made from a paperboard material suitably treated in accordance with commercially available materials and processes to render it suitable for use in a medical environment.

#### **Brief Description of the Drawings:**

The foregoing as well as other objects and advantages of the invention will be apparent in the following detailed description when considered in conjunction with the accompanying drawings, wherein like reference characters refer to like parts throughout the several views, and wherein:

Figure 1 is a top perspective view of an IV line holder and holder according to the invention.

Figure 2 is a side view in elevation of the line holder of figure 1.

Figure 3 is a side view in elevation of the line holder, with the bendable wings at opposite sides folded downwardly to receive lengths of IV line, shown in broken lines.

Figure 4 is a top plan view of the IV line holder of the invention, showing a plurality of IV lines in broken lines.

Figures 5-8 are top plan views of the IV holder, showing alternate shapes to the slits extending between the outer edges of the wings to the openings.

Figure 9 is a top plan view of an alternate embodiment of the IV line holder, wherein a bendable wing is provided at only one side of the holder.

#### **Best Mode for Carrying Out the Invention:**

With particular reference to figures 1-4, the IV line holder of the invention is indicated generally at 10, and comprises a thin, unitary, rectangular or square sheet of paperboard having

sufficient thickness and stiffness only to generally retain its shape and hold the lines attached thereto. A pair of spaced, parallel scores **11** and **12** are formed along opposite sides of the sheet, forming two bendable wings **13** and **14** at opposite sides of a planar central portion **15**. A plurality of openings **16** are formed in the wings, with the openings in opposite wings defining aligned pairs of openings. As depicted in figure 1, the openings may be made larger than the lines for loosely receiving the lines. Slits or cuts **17** are formed in the edges of the wings, extending from the respective openings through the edge. As shown in figure 1, the slits extend through the edge of the wings in line with the lines **L** held in the respective openings.

If desired, as seen in figure 4, for instance, short radially extending cuts **18** may be made around the edges of the openings **16a** to lend some flexibility to the edges of the openings for snugly receiving the lines without crushing or deforming the lines. Further, as shown in this figure the slits **17a** enter the opening at an angle and out of alignment with the axis of the lines. This helps prevent the lines from being inadvertently displaced back through the openings during use of the holder.

As shown in figure 1, lines **19** may be pre-printed on the top or anterior surface of the holder **10**, dividing the anterior surface into areas corresponding to locations of lines extending beneath the central portion of the holder. The nurse or other medical personnel may then use a suitable implement to place identifying indicia on the holder to clearly label and identify the purpose of the line held at that location. Color-coded indicia **20** may be placed on the anterior surface, if desired, also as shown in figure 1.

As depicted in figure 5, the slits **17b** have a chevron shape, and in figure 6 the slits **17c** extend diagonally to the openings, out of alignment with lines placed in the openings. Both of these variations help retain the lines in the openings.

Figure 7 depicts a further variation, wherein notches **21** are formed in the outer edges of the wings, in alignment with the slits **17**. This arrangement guides the lines into the ends of the slits during attachment of the lines to the holder.

A still further variation is shown in figure 8, wherein two cuts **22** and **23** are made orthogonally to a third cut **24** in the wings **13** and **14**, defining small flaps **25** that are foldable about fold line **26** extending between the ends of cuts **22** and **23**, and defining openings **16b** that are rectilinear in shape. Slits **17d** extend from the edge of the respective wings to the openings,

in offset relationship to the centerline of the openings, and notches 27 are formed in the outer edges of the wings at the ends of the slits.

An alternate embodiment of the invention is shown in figure 9, wherein a bendable wing 13 is provided on only one side of the planar portion 15' of the holder 10', and the slits 17e  
5 extend in a straight line at an angle from an offset position on the edge of the openings 16a.

The invention provides a simple and inexpensive means for holding IV lines and keeping them separated and organized, with provision for easy labeling of the lines to identify the purpose or use of each line.

While particular embodiments of the invention have been illustrated and described in  
10 detail herein, it should be understood that various changes and modifications may be made to the invention without departing from the spirit and intent of the invention as defined by the scope of the appended claims.

WHAT IS CLAIMED IS: